



INDEXA

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VKØEK Heard Island 2016

New technology changes the DXpedition

By: Robert W. Schmieder KK6EK and the VKØEK Team

Hearth Island is arguably the most difficult destination of any DXCC entity. What makes it hard is a combination of factors: ferocious weather, distance from civilization (almost 2500

miles across the Southern Ocean), formidable effort of obtaining a permit to visit, the requirement to spend almost two months away from home, the near-impossibility of finding appropriate vessel transportation, the cost to the participants, the necessity to raise the total project financing, the requirement for Australian public liability insurance, the need to travel extensively to seek partners and coordinate plans, the extensive investment in creating and maintaining websites and other social media, the need for extensive planning. Combined together, these factors make Heard Island one of the most difficult DX destinations in the world, the reason why activations take place there only about every 20 years.

I was one the organizers of the previous DXpedition in 1997 (VKØIR), well-documented in my book *VKØIR Heard Island*. But my vision of a return expedition was not based on filling logbooks with QSOs. My vision, which I first saw clearly on my return from 3YØPI Peter I (1994), was no less than a major change in how we do DXing and DXpeditions, to provide more of what DXers and DXpeditioners want and are coming to expect. In my various books, I have described what I believe all DXers want—a greater ability to successfully make a confirmed QSO, and perhaps to have more fun and satisfaction in doing it. My 1994 insight to achieving this was to introduce new technology and techniques to provide tools to assist DXers. The first implementation of this strategy was on the 1995 Easter Island DXpedition XRØY/Z—the first to involve the internet—which enabled expedition websites, uploaded logs, next-day QSLs, and direct communications between DXers and the DXpedition. Ten years later, the 2005 Kure Atoll DXpedition K7C was the first to provide a real-time internet connection (DXA), enabling one minute confirmation of logged QSOs. And now, after another decade, as I thought about Heard Island again, I envisioned an expedition in which social media would provide an extensive set of new tools. All these developments were designed to provide assistance to the DXer to enhance the chances of success and to enable attracting and satisfying a new category of sponsors (non-radio corporations).

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inside... *An introductory deal for INDEXA members from a new advertiser. See Page 10*

VKØEK Heard Island 2016 (con'd)

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PREPARATION

In May, 2012, I announced plans to organize and lead a Heard Island expedition. But in 20 years, the challenges of southern polar DXpeditions had increased significantly. It would be longer, more expensive, and require significantly more formalities now than in the mid-1990s. My idea was to combine the following: (1) A multi-disciplinary project, including radio, science, and information technology; (2) Completely open planning; (3) Extensive outreach via social media; (4) Significant commercial sponsorship; and (5) Legal and fiscal soundness, including risk management.

It was obvious from the start that the radio community alone could not raise the finances for such an expedition. My solution was to combine the radio operation with two other activities: field science and IT. None of the three activities alone could muster sufficient support for such an ambitious project, but together they could. Automatically, the expedition would be multi-disciplinary.

I came equipped with considerable experience in organizing and leading expeditions under my nonprofit organization Cordell Expeditions. Rich Holoch KY6R enthusiastically agreed to be the co-organizer. His creative contributions and extraordinary hard work would be central to the realization of project.

After much difficulty in trying to get a vessel to take us to Heard Island, in mid-2015 Nigel Jolly, owner-operator of the famous ship R/V Braveheart, agreed to do the trip. They would meet us in Cape Town, South Africa and make a 12-day sail to Heard Island.

Launching a fundraising drive, we obtained the support of more than 50 organizations and more than 5000 individuals. HDT Global provided AirBeams (military-grade tents that erect by inflation in about 20 minutes), Inmarsat provided four BGAN satellite terminals and unlimited air time, and Disc-O-Bed provided high-quality bunks. In rough numbers, foundations and clubs contributed about \$80,000, individuals

about \$100,000, corporations about \$40,000, and the team about \$280,000. Thus, the total cost was roughly a half-million dollars.

Obtaining the permit was a major effort. The Australian government had become very resistant to independent expeditions to Heard Island, and I made two separate trips to the Australian Antarctic Division (AAD) in Tasmania to negotiate. I wrote

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Dave K3EL was the radio team leader for VKØEK. He set the policies, arranged much of the radio gear, and managed the day-to-day operations on the island.

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hundreds of pages of detailed description and justification for the multi-disciplinary project.

All members of the team were licensed radio operators. Dave Lloyd K3EL took the major responsibility as Radio Team Leader. Arliss Thompson W7XU came in as the doctor. Two members (Gavin Marshall and Fred Belton) were experienced mountaineers and volcano explorers, and I designated them to carry out the field work. Of the 1997 VKØIR team, I was the sole survivor.

The radio equipment included major contributions from Elecraft, DX Engineering, Array Solutions, Spiderbeam, Cordell Expeditions, and numerous organizations. The cargo was consolidated in Virginia, and shipped in one 20-ft. container to Cape Town.

THE EXPEDITION

The permit from the AAD required that our cargo be exhaustively cleaned and inspected, and the vessel be inspected for rats and possible infestation by insects, seeds, spores, and fungus, so we spent most of our time in Cape Town cleaning and repacking. Anticipating the need for a vehicle to move the cargo on the island, I purchased an All-Terrain-Vehicle (ATV) and it was loaded with everything else aboard the vessel.

We sailed on March 11, 2016. The voyage was long, but we were very active on the radio, and we deployed a series of scientific buoys provided by NOAA and the Woods Hole Institute. After twelve days we arrived at Heard Island and were greeted with the extraordinary sight of Big Ben, the 9000-ft.

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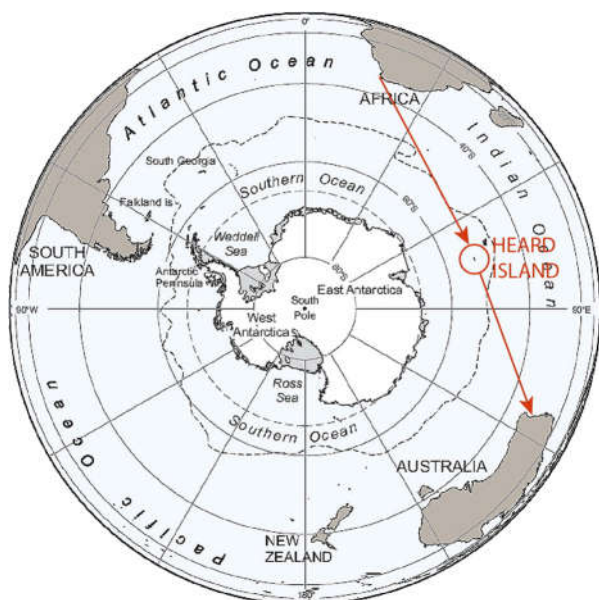


A composite image of the 2016 Cordell Expeditions campsite at Atlas Cove, Heard Island. The live volcano Big Ben in the background; near its 9000-ft. summit it was smoking, the aftermath of an eruption two months before. The AirBeam tents are military-grade shelters, provided by the manufacturer, HDT Global. With an air compressor they inflated completely in about 20 minutes, and withstood very high winds. The ATV shuttle in the background was used to ferry equipment from the beach.

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live volcano. Our long lenses captured images of the smoking crater near the peak, but we didn't see any streaming lava. We made a quick reconnaissance trip to identify a good location for our camp, near the ruins of the 1947 Australian research station (ANARE) at Atlas Cove, but we didn't find one.



Track of the vessel Braveheart on the 2016 Heard Island Expedition. The team assembled in Cape Town, South Africa, and ended the expedition in Fremantle, Western Australia. The total distance of the voyage was about 5000 miles

Early the next day, we found a perfect campsite: a 20x60 ft. flat area about a quarter mile from the beach. Within an hour the ATV began delivering our gear, and by mid-morning the tents were up. Several four-square vertical array antennas were erected on flat ground in front of the camp, and several Yagi antennas were put on the elevated rocks around the camp. Within 15 hours of landing, we had several stations completed, and we activated VKØEK. To our great surprise, we heard not a single SSB station, a pattern that was to be frustratingly common during our entire stay. CW it was, then, and thereafter. Within 48 hours of landing we had 6 operational stations.



The operations tent: radio at right, internet communications far left, galley near left. If you turn around you would see the dormitory tent, with bunks for 14 men.

The BGAN satellite terminals provided direct access to the internet. This meant that we could use our special software, DXA, to provide real-time online

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The Expedition Organizer and Leader, and author of this article, Robert Schmieder KK6EK, at one of the VKØEK stations. He was the only member of the 1997 Heard Island team on this expedition.

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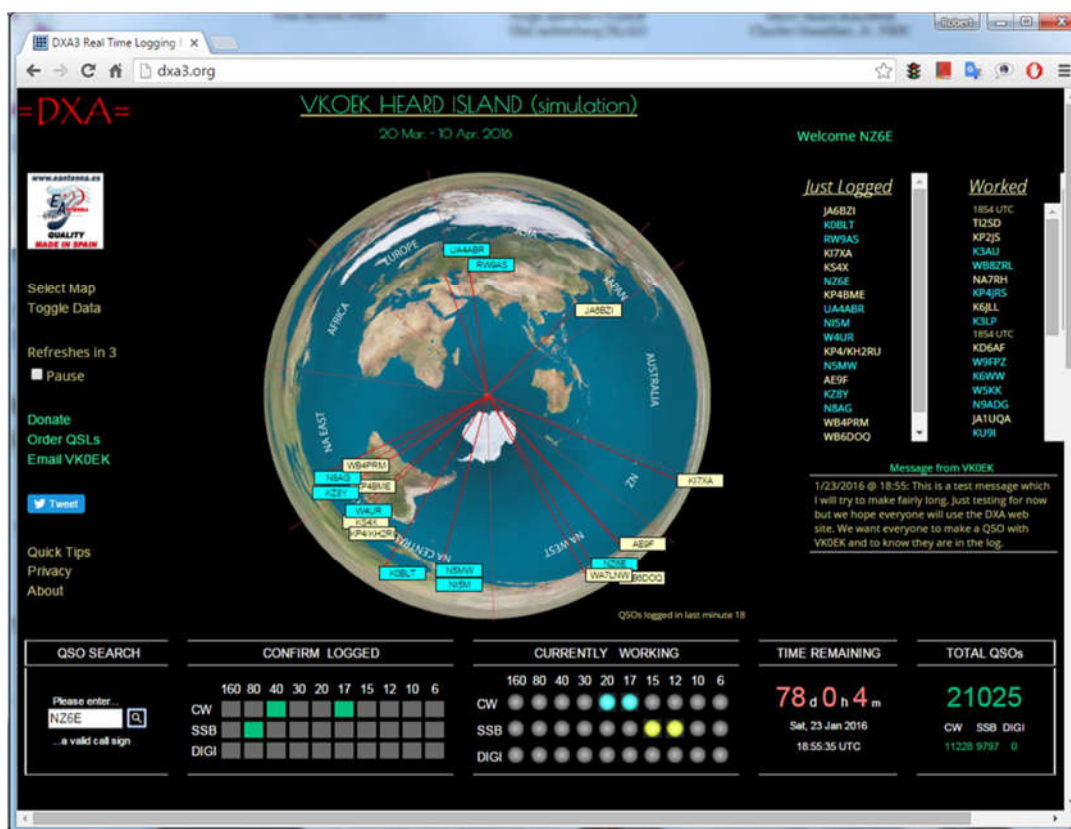
confirmation of QSOs. Once each minute it uploaded the log updates, and anyone with a browser anywhere in the world could get confirmation of his QSO within a minute of making it. Almost always there were 10,000 people watching DXA. We also used the BGANs for email, Skype interviews, and for expedition and personal business.

By the third day we fell into a routine—the ops worked the pileups, and the field team explored the area around Atlas Cove, making extended treks to document the plants, animals, glaciers, and the trash that accumulates from the ocean. The crew from the Braveheart brought gasoline, water, food, clean kitchenware, and laundry, usually around noon. One day we carried out the first ever remote radio operation on a DXpedition. I spent considerable time handling email and filing required daily reports to the

AAD. Outside, the temperature was around zero centigrade, but the wind chill was fierce, and we found it difficult to be outside for much longer than required to service the generators.

On April 4, three of the team (Gavin, Fred, and myself) were taken on the Braveheart to the opposite end of the island, 20 miles from Atlas Cove, to inspect the area around Spit Bay and to explore the recently created Stephenson Lagoon. We had thought that the Spit Bay area might help with propagation to the North America west coast, but we were quickly dissuaded from that because the surf was unworkable. In fact, the radio log actually showed that the operation was unnecessary. We did have a brief weather window, and we burst through the high surf to enter the 2-mile-wide la-

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DXA provided DXers with effectively real time feedback, confirming a successful QSO with VKØEK in about a minute after it was logged.

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goon. For 3 hours we excitedly documented what we found with photographs and specimens. It was a “lost continent” experience; we were the first people to observe and document the extensive changes due to global warming.

COMPLETION

Near the end of our stay, propagation dwindled to somewhere between terrible and none. On April 11, we had a short window of reasonable weather, and it was decided to strike camp and leave. Good thing—as we were departing, a front arrived that almost certainly would have stranded us on the island for another week at least. The voyage from Heard Island to Fremantle, Western Australia, was another eleven days. We mostly spent the time resting and watching the ocean, but we did continue to work DXers maritime mobile and we deployed another set of scientific buoys.

We arrived in Fremantle early on April 22, and were greeted by customs, immigration, and biosecurity officials, as well as a representative from the AAD, who flew over from Tasmania specifically to look at our specimens. Apparently she was satisfied, and we hammered the lids on the buckets and prepared to ship them. The rocks went to the University of Tasmania and the water and soil samples came to me in California, to be distributed to specialists in museums and universities. The next day the Northern Corridor DX Group threw us a celebratory BBQ, and we began to prepare to disperse.

My transition back to civilization was moderated by two delightful days in Sydney with Grahame Budd, the legendary explorer of Heard Island. Grahame was the first to summit Big Ben (in 1965, done only twice since), and is probably the world’s living authority on the island. We toasted the current project

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(Clockwise from top left): Hans-Peter Blattler (HB9BXE), Adam Brown (K2ARB), in the background is Dave (WJ2O) twenty year veteran of Cordell DXpeditions, Bill (AEØEE) (who never seemed to sleep!), Alan Cheshire (VK6CQ) our Australian government liaison, Ken Karr (NG2H), and Vadym Ivliev (UT6UD) our 160m antenna guru.

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with a 50-year-old whiskey from his summiting expedition.

ACCOMPLISHMENTS

VKØEK logged 75,034 QSOs (55879 CW, 15759 SSB, 3396 RTTY). The distribution across bands was: 160m:3238, 80m:5902, 40m:11797, 30m:10831, 20m:9012, 17m:10004, 15m:13324, 12m:7357, 10m:3569. These totals were less than expected for normal propagation; unfortunately we had 3 or 4 days of very low propagation, which probably reduced the totals by about 15,000 QSOs. The expedition was multi-disciplinary. As such, there were many innovations and accomplishments that went far beyond a normal "pure radio" DXpedition. We list some of them here:

Radio

VKØEK: more than 75,000 QSOs, about 4000/day
 DXA: More than 70,000 unique callsigns entered in the online real-time radio log
 Maritime mobile: 10,000 QSOs, about 400/day
 WSPR operation during the the two voyage legs
 More than 3200 QSOs on 160m
 First remote radio operation on a DXpedition
 First JT65 operation on a DXpedition

Environmental science

Buoy deployment (10 total) for the NOAA and Woods Hole Oceanographic Institute
 Geological samples for the University of Tasmania
 Exploration and rock samples from the Laurens Peninsula
 First boat entry into Stephenson Lagoon: Photo-documentation of glacial retreat and erosion, samples of shoreline sediments and lagoon water, documentation of the degradation of the two

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The Cordell Expeditions Heard Island 2016 team, on the day of departure, with their national flags. Left to right: NP4IW, WJ2O, VK6CQ, K3EL, KK6EK, UT6UD, HB9BXE, NG2H, K2ARB, VK2BAX, KM4MXD, N6TQ, W7XU, AEØEE.

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breakwaters that formerly isolated the lagoon from the ocean

First flight of a drone on Heard Island

First use of a GigaPan camera for ultra-high-resolution photographs of Heard Island

Deployment of a weather station and temperature/illumination sensors around Atlas Cove

Recording of cloud patterns for a cooperating school class

Observation of skeletons from a mass dolphin death

Collection of an insect of undetermined species

Collection of streamwater samples and soil samples

Outreach

Websites: www.heardisland.org (static) and www.vk0ek.org (dynamic)

Newsletter (distributed electronically roughly monthly)

Help desk ("Contact us") developed and operated by KY6R and the Diablo DXers

Social media (Facebook, Twitter, etc.)

GPS trackers on the voyage and in the Stephenson Lagoon

Skype conferences from Heard Island with W5KUB and classrooms in California and Ukraine, and live call to the International DX Convention in Visalia

Audio Log recorded daily from Heard Island

Repair of the AAD refuge shelters and deposition of emergency food

One result is the documentation of the major and rapid effects of global warming on the glaciers of Heard Island, and its inevitable effects on the landscape and the biological communities. The very recent creation of the Stephenson Lagoon by glacial melting and the destruction of the breakwater barriers to the lagoon present us with an invaluable opportunity to document the effects of incursion of seawater into a glacial landscape. Among the long-term projects is examination of the soil and water samples, which could contain undescribed species that will alter the known biodiversity.

RETROSPECTION

So has this project changed DXing, as we hoped? I think, *potentially*, yes. I claim that the first three initiating events were: (1) Introduction of the Internet (XRØY/Z, 1995); (2) Implementation of real-time online logs (K7C, 2005); and (3) Extensive use of

social media (VKØEK, 2016). What's next? I believe it will be "systems integration." This could include remote operation, software-defined radio, adaptive signal processing, automatic logging, integrated station operation, signal optimization, cooperative activities, new digital modes, and other techniques. Clearly, there is plenty of richness for another major step forward. I believe this step will inevitably happen, so long as DXpeditions continue.

APPRECIATIONS

The onsite radio team consisted of Robert Schmieder KK6EK (Expedition Organizer/Leader), David Lloyd K3EL (Radio Team Leader), Adam Brown K2ARB, Alan Cheshire VK6CQ, Arliss Thompson W7XU, Bill Mitchell AEØEE, Carlos Nascimento NP4IW, Dave Farnsworth WJ2O, Fred Belton KM4MCD, Gavin Marshall VK2BAX, Hans-Peter Blattler HB9BXE, Jim Colletto N6TQ, Kenneth Karr NG2H, and Vadym Ivliev UT6UD. The onsite team was extended by the invaluable support of the vessel Braveheart.

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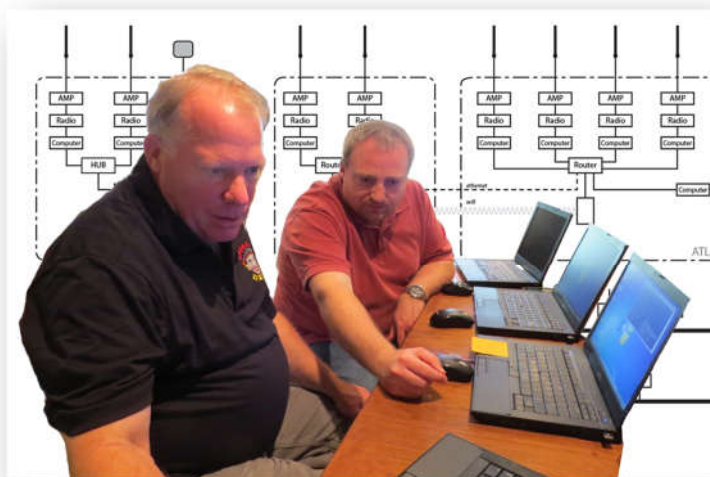


The crew of the Braveheart, which was essentially an extension of the VKØEK team. Front row, left to right: Elliot Stead, Matt Jolly (skipper), Nigel Jolly (owner), Charlie Bedford. Upper row: Bill Roundhill, Neal Broughton, Nick East.

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Rich Holoch KY6R was the offsite co-Organizer, who created and led the West Coast support group "Diablo DXers". Especially important were Pete Bouget W6OP, who developed DXA Version 3; Mike Coffey KJ4Z, who implemented the remote radio operation and the AudioLog; and Tim Beaumont MØURX, who was the QSL manager. Additional support teams included the East Coast support group, led by Manny Rodriguez K4MSR; the Cape Town, South Africa, support group, led by Paul Johnson ZS1S; and the Northern Corridor DX Group in Perth, Western Australia, led by Keith Bainbridge VK6RK.



Rich Holoch KY6R (VKØEK co-Organizer) and Mike Coffey KJ4Z (and others) worked up the onsite network and extensive support system for the expedition. VKØEK easily fielded the most extensive DXer support system ever.

Corporations making major donations in kind included HDT Global, Inmarsat, Disc-O-Bed, Sound Seal, Acoustical Solutions, Elecraft, DX Engineering, Array Solutions, Arlan Communications, Spiderbeam, K1NSS Design, and numerous others. Major funding support was provided by the Northern California DX Foundation, German DX Foundation, the International DX Association (INDEXA), and many others. More than 5000 individuals made contributions

to the project. More than 200 people donated more than \$100, and more than 30 people donated \$300 or more.



ADDITIONAL INFORMATION

The main website www.heardisland.org contains extensive documentation of the project, including a full listing of all the contributors, the VKØEK Newsletters, and a poster of the team and logistics on a world map. The blog website for the DXpedition is <https://vk0ek.org>. Souvenir mugs and shirts can be obtained through the web page <https://shop.vk0ek.org/souvenirs.html>. You can hear the daily verbal reports made during the expedition on the AudioLog at <https://media.vk0ek.org/>. QSL information is at http://www.heardisland.org/HD_pages/HD_qsls.html

-73 The VKØEK Team

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